International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395-0056
Volume: 05 Issue: 04 | Apr-2018 www.irjet.net p-ISSN: 2395-0072

ELECTRICITY GENERATION BY VEHICULAR MOVEMENT ON A SPEED BREAKER

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Abstract

Power is produced by modifying the existing speed breakers by implanting a battery charging device. As vehicles overcome the speed breaker the contraption of rack and pinion moves up & down and rotates a flywheel which is working on the crank and slider mechanism. The device is a viable method to create power as the number of vehicles overcoming the speed breakers are large in numbers. The device can be successfully put where there is a high frequency of vehicular movement. The slider mechanism gathers the power from vehicle overcoming the speed breaker and translates it to a rotating device which is connected to a 12V DC power generator.

Keywords

Speed Breaker, DC Generator, Energy Generation, Energy Transfer, Crank and slider device.

INTRODUCTION

At present power is required by all individuals and is always high in demand. In the present device we are able to utilize the movement of vehicle through a speed breaker and transform the power usefully by tapping its movement on a speed breaker.

Beneath the speed breaker, an oscillating device is fitted, this device is connected to a rotating device called a heavy flywheel. This flywheel is made to rotate a shaft having gears which increases the rpm.

The device which has been fabricated is mounted under the speed breaker and is not visible. When vehicle goes through speed breaker it produces power. This set up requires extremely essential mechanical parts. The power generated is utilized in recharging 12V DC battery. Now the battery is connected linearly to street light and the light glows effectively. The switching on and off of the light is controlled by LDR device which acts as a switch connected it to the battery when atmospheric light is below average or dark. Likewise disconnecting the battery by LDR when the sun light is in the horizon.

WORKING

In this project we have used the fundamental principal of electromagnetic induction in which whenever a conductor is rotated in a fixed magnetic field an induced emf is produced whose magnitude is proportional to rate of change of flux. We have used in this principle a rotor which is moved with the help of rack and pinion in a fixed magnetic field. The motion to the rotor is provided by a gearing mechanism where a large is made to rotate a small gear and depending upon the gear ratio the speed is multiplied. The movement of tyres on top of the speed breaker flexes the helical carbon steel which comes back to its original shape moment the tyres leaves the breaker. Thus the vertical oscillatory motion is transmitted to rotary motion through a crank and slider mechanism. Thus an emf which is induced in AC form is tapped and converted to DC current by a bridge rectifier circuit. The DC 12V-14.5V then generated which is utilized in charging of the batteries kept in series. The added feature of the setup is that when there is no vehicular movement and sun is there then the PV (Photovoltaic) cell produces power which is again goes for battery charging. To prevent battery over charging a cut off device employing battery overcharging protection device is fitted.

WORKING MODEL-

Calculations-Let us consider,

The mass of a vehicle moving over the speed breaker = 1500Kg (Approx.)

Height of speed brake =10 cm or 0.1m

Work done=Force x Distance

where,

Force = Weight of the Body = 1500 Kg x 9.81m/s2 = 14715 N or 14.715KN

Distance travelled by the body = Height of the speed brake =0.1m

Output power= (F x D)/T = (14715 x 0.1)/60 = 24.525 Watts

Energy developed for one vehicle passing the speed breaker arrangement for one minute = 24.525 watts.

Energy developed for one hour = 1471.5 Watts

Energy developed for one day = 35316 Watts or 35.316 KW

CONCLUSION

Our device of electricity generation by movement of vehicle over a speed breaker is utilization of wasted energy conserved in the form of DC power in a 12V rechargeable maintenance free battery's connected in series. Our device is a prototype model showing power generation and charging of a single battery. If this project is implemented we will get absolute green power which is leaving no or zero carbon footprints in the atmosphere. The device can be suitably employed in rural and urban areas with high vehicular movement and having speed breakers to control the speed of vehicle movement.

FUTURE SCOPE

This device is still in the stage of evolution. In the coming days it can be utilized for power generation. Electricity generation is not suffered by any environmental conditions. It is totally pollution free method of generating electricity. These devices implant at parking locations, traffic signals etc. With the help of the device we can store electricity in charging batteries and later using it to torch the street lights.

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